

**REMARKS/ARGUMENTS**

Claim 6 is amended by this response. Claim 18 is added. Accordingly, claims 6, 8-12, and 17-18 remain pending in the instant application.

Embodiments in accordance with the present invention relate to detection of endpoint of a plasma-based semiconductor process wherein an endpoint detector is in selective fluid communication with the chamber exhaust through a valve:

[d]uring initial and midpoint stages of the chamber cleaning process, isolation valve 112 is closed by controller 120 to ensure that the flow of chamber exhaust through throttle valve 108 does not reach endpoint detection apparatus 110. As illustrated below, this is beneficial because effluent from the chamber during early and intermediate cleaning stages may contain high concentrations of materials that could reform on exposed surfaces of endpoint detection apparatus 110, degrading the accuracy of endpoint detection. (Emphasis added, page 6, line 31 - page 7 line 2)

According to a specific embodiment, the endpoint detector may be placed into fluid communication with the chamber exhaust based upon an endpoint qualifier:

approach of the endpoint of the chamber cleaning process is identified by an endpoint qualifier, based for example on a predetermined elapsed time of the chamber cleaning process. The endpoint qualifier would typically be determined empirically for a specific tool based upon previous deposition of material according to a particular recipe, such that occurrence of the endpoint qualifier, and the approach of chamber cleaning endpoint, could be predicted with confidence without having to rely upon the endpoint detector. For example, optical emissions from a non-isolated endpoint detection cell could be monitored from the commencement of prior CVD chamber cleaning runs in order to identify an average elapsed time for endpoint qualifier. (Emphasis added; page 8, lines 6-15)

Pending independent claim 6 accordingly recites:

6. A method of detecting an endpoint of a plasma based semiconductor fabrication process, the method comprising:  
conducting a previous run of a plasma-based semiconductor fabrication process to empirically determine an endpoint qualifier;  
providing an endpoint detector;

isolating the endpoint detector from exposure to an exhaust of a subsequent run of the plasma based semiconductor fabrication process during an initial stage of the subsequent run of the process until the endpoint qualifier is reached; and  
exposing the endpoint detector to exhaust from the process during a later stage of the subsequent run of the process only after the endpoint qualifier is reached.

The Examiner has rejected the pending claims as obvious under 35 U.S.C. 103 in light of Japanese patent No. 5-326457 to Nonaka ("the Nonaka patent"), considered in light of U.S. patent no. 5,986,747 to Moran ("the Moran patent"). These claim rejections are traversed as follows.

As a threshold matter, the Examiner is reminded that in order to establish a prima facie case of obviousness, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." MPEP 2142. Here, there is no teaching or even suggestion in the '574 patent, or any of the patents relied upon by the Examiner, to selectively expose an endpoint detector to exhaust after an endpoint qualifier has been reached.

The Nonaka patent does not teach or suggest selective exposure of an endpoint detector to exhaust. Rather, the Nonaka patent simply positions an endpoint detector in an exhaust branch pipe.

As for the Moran patent, this reference does disclose use of a valve to sample exhaust from a chamber. Apart, however, from indicating that sampling takes place sometime after processing has begun, the Moran patent contains no teaching or suggestion regarding the timing of the sampling.

The Moran patent does describe controlling actuation of the valve to control the duration of the sampling:

A valve 126, connected to the port 124, and a supplemental exhaust system 128, regulate the residence time of byproducts in the analysis chamber 122. (Emphasis added; col. 3, lines 35-37)

However, this passage cannot be read by the Examiner to teach, or even suggest, exposing the detection unit to exhaust only after an empirically-determined endpoint qualifier has been reached, as is now recited by the pending claims.

In the latest office action, the Examiner also relied upon U.S. patent no. 5,472,561 to Williams et al. ("the Williams patent"). However, this reference describes only a specific architecture for a RF endpoint detection monitor. It says nothing to teach or suggest exposing such a monitor to chamber exhaust only after an empirically-determined endpoint qualifier has been reached.

Because the combination of references relied upon by the Examiner fails to teach every aspect of the pending claims, it is respectfully asserted that the claims cannot be considered obvious in light of those references. Continued assertion of the obviousness rejections is improper, and these claim rejections should be withdrawn.

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested. If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Kent J. Tobin", with a stylized flourish extending to the right.

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